

Compact Panoramic 2-fold and 4-fold Diamond Anvil Cell with 80+ and 60+ degrees side openings

Models PanDAC-2F-80D and PanDAC-4F-60D(-NRIXS)

DAC Tools offers a variety of compact piston-cylinder type Diamond Anvil Cells (DACs) suitable for variety of experimental techniques such as X-ray diffraction in radial and axial scattering geometry, inelastic X-ray scattering, X-ray tomography, various time-resolved experiments with pneumatic and piezo pressure control, electric measurements, as well as optical measurements such as Raman spectroscopy among others. With proper diamond culet size (<250 μm), diamond parallelness and alignment, and proper sample preparation, the DAC can readily reach and exceed megabar pressures. If hydrostatic conditions are required – the DAC can be loaded with inert gases as pressure medium in GSECARS / APS type and compatible gas loading systems.



Our compact panoramic DAC comes in several modifications – 2-fold with round but cut on top cylinder and 4-fold with round or squared cylinder (for NRIXS measurements with down to 11 mm APD detector to sample distance). The two-fold DAC offers up to 85° opening in horizontal direction (sample plane) and up to 81° opening in vertical (with undercut seats) 180° apart. The four-fold panoramic DAC offers four side cones with ~63° - 64° degrees opening at 90° apart. The X-ray diffraction opening in axial direction depends on the diamond/seat combination and is typically ~30-40 degrees with WC seats with 1.1-1.65 mm opening and up to 60 degrees with cBN or conical support seats. For optical measurements the effective working distance is about 11-12 mm with numerical aperture of up to 0.5.

The panoramic DAC is typically made of Stainless Steel 440C or Vascomax C-300/350 superalloy hardened and tempered to HRc 56-58 for optimal properties. The DACs can also be made from more exotic materials such as Beryllium Copper or Silicone Bronze. The piston can be coated with a layer of chrome on demand, or the whole DAC can be coated with MoS₂ for better lubricity and protection from elements. The DAC can be used at both cryogenic conditions and high temperatures with resistive heating (with special setups and environments).

The DAC allows for multiple ways of pressure control. Typically the pressure in the DAC is controlled by four #10-32 screws from either side depending on experimental setup. The design of the DAC allows for use of decompression springs which can be engaged before or during the experiment. The DAC can be easily integrated with single membrane or piezo-electric pressure control systems for remote pressure control and time-resolved experiments. Some examples of application of a similar DAC are described in *Sinogeikin et al., Rev. Sci. Instruments* **86**, 072209, 2015.



Specifications of Compact Panoramic 4-fold Diamond Anvil Cell with 60 degrees side openings

Main DAC Specifications

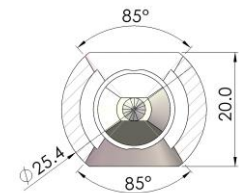
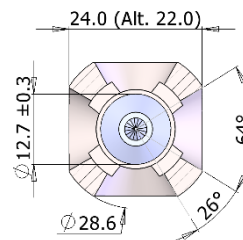
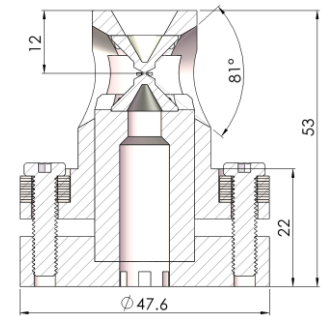
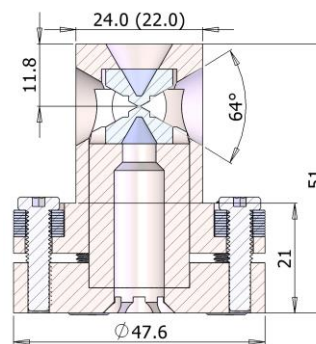
- Height: ~2.0" (~51-53 mm)
- Diameter @ base: 1.875" (47.63 mm)
- Diameter @ top: 1.0"-1.125" (25.4 - 27.9 mm)
- Working distance: ~11.8 mm – 12.0 mm
- Mass: ~ 320 g
- Optical angles (N.A.): 60 degrees (0.5)
- Axial X-ray opening: ~28-60 degrees
- Side openings: ~63-64 degrees (4x)
~80-85 degrees (2x)
- Seats: Tungsten carbide (typ.), cBN optional
- Screws: 10-32 x ~1.0" (vary), All right-handed
- Spring washers: 0.375" OD, 0.190" ID, 0.015-0.020" thick
- Diamond seat diameter: ~0.5" (12.5-13.0 mm)
Max 0.52" (13.4 mm)
- Minimum height of two seat + diamonds: 0.49" (12.5 mm)
- Maximum pressure: > 100 GPa with proper diamonds and alignment

DAC Material Properties

- Material:: Stainless 440C or Vascomax C300/350
- Ultimate strength: 1750-2400 MPa (typ)
- Yield strength (0.2%): 1280-2340 MPa (typ)
- Magnetic?: Yes

A. 4-fold Pan DAC with up to 64 x 64 degrees openings at 90 degrees

B. 2-fold Pan DAC with up to 85 x 81 degrees openings 180° apart

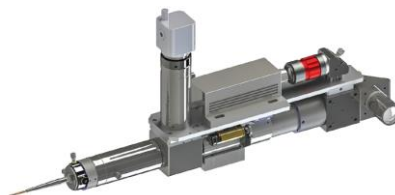


Related equipment

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DAC Accessories



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11.28.2022